OIPE
JC95
AUG 16 2004
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G4 Domain

1354 1367

1a

1b

1c

1529

1530

G5 Domain

1713

FIG._1A

G4 Domain

1354 1367

1529

MFP1

MFP2

MFP3

MFPs4

FIG._1B

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FIG._1C

G5 Domain

1530   1713

1713   1560

MFP5   MFP6

Or   Or   Or

}MFPs7

FIG._1D

G4/G5 Domain

1713

1529   1530

MFP8

1398   1399

1399

Or   1713

}MFPs9

854

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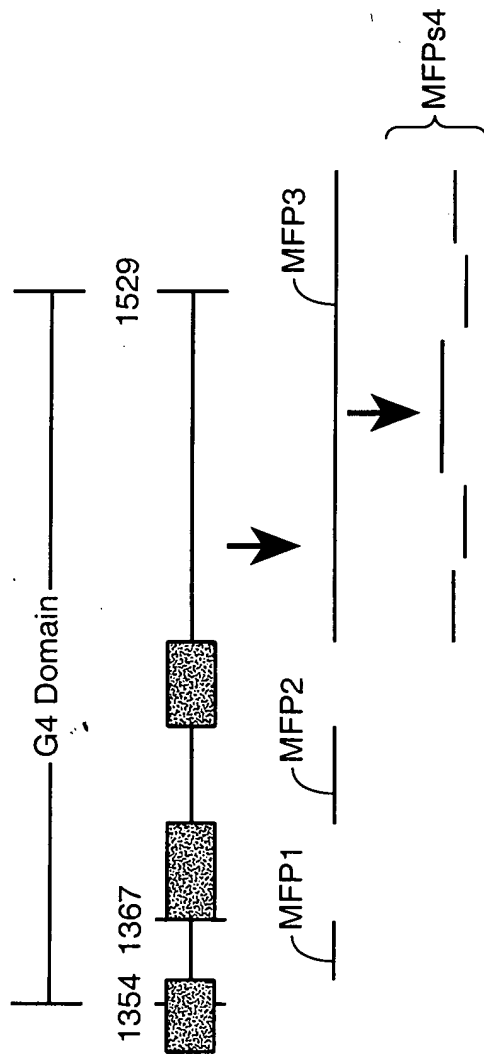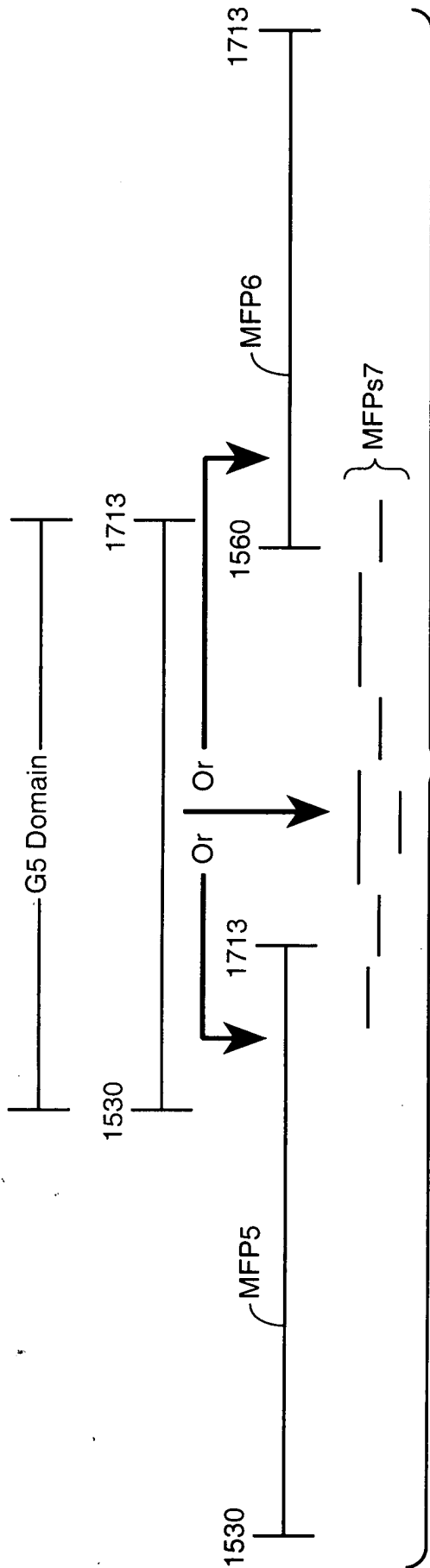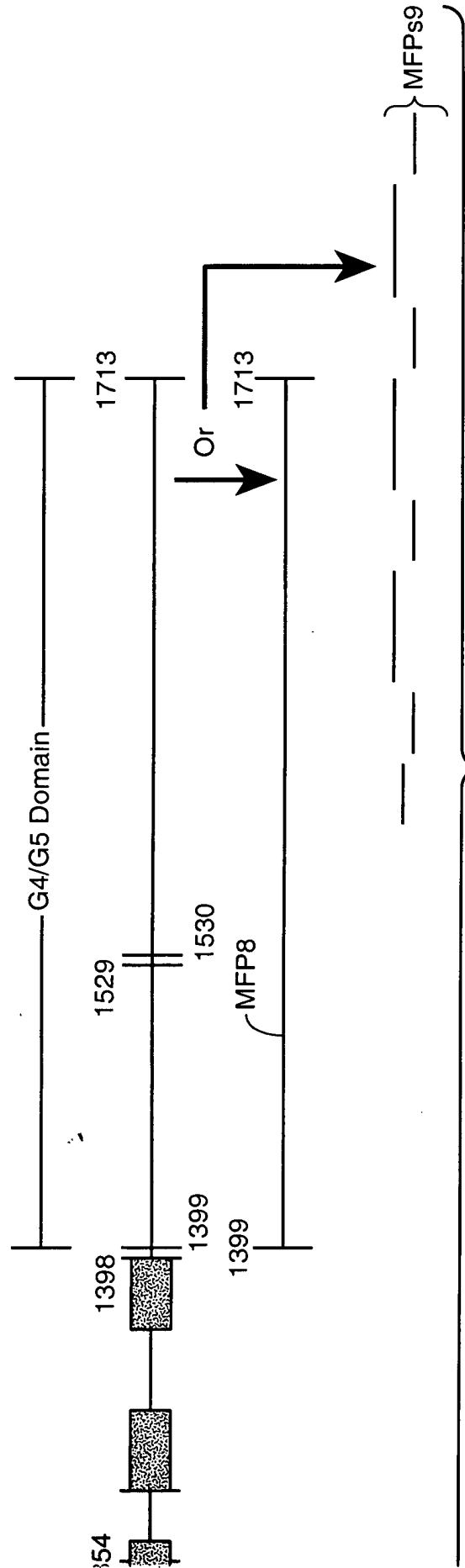
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FIG._2A-2

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FIG._2B

```
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5401  gatatttcgg gaatccccag aaaattcgga gtagctgcca accatgcagt tgtaacagca
5461  atggccagct gggcagctgt catcccctga ctggagactg cataaaccaa gaacccaaag
5521  atagcagccc tgcagaagaa tgtgatgatt cgacagctg tgtgatgacc ctcctgaacg
5581  acctggccac catgggcgag cagctccgcc tggtcaagtc tcagctgcag ggcctgagtg
5641  ccagcgcagg gcttctggag cagatgaggc acatggagac ccaggccaag gacctgagga
5701  atcagttgct caactaccgt tctgccattt caaatcatgg atcaaaaata gaaggcctgg
5761  aaagagaact gactgatttg aatcaagaat ttgagacttt gcaagaaaag gctcaagtaa
5821  attccagaaa agcacaaaca ttaaacaaca atgttaatcg ggcaacacaa agcgcaaaag
```

```
5881  aactggatgt gaagattaaa aatgtcatcc ggaatgtgca cattctttta aagcagatct
5941  ctgggacaga tggagaggga aacaacgtgc cttcaggtga cttttccaga gagtgggctg
6001  aagcccagcg catgatgagg gaactgcgga acaggaactt tggaaagcac ctcagagaag
6061  cagaagctga taaaagggag tcgcagctct tgctgaaccg ataaggacc tggcagaaaa
6121  cccaccaggg ggagaacaat gggcttgcta acagtatccg ggattcttta aatgaatacg
6181  aagccaaact cagtgacctt cgtgctcggc tgcaggaggc agctgcccaa gccaagcagg
6241  caaatggctt gaaccaagaa aacgagagag ctttgggagc cattcagaga caagtgaaag
6301  aaataaattc cctgcagagt gatttcacca agtatctaac cactgcagac tcatctttgt
6361  tgcaaaccaa cattgcgctg cagctgatgg agaaaagcca gaaggaatat gaaaaattag
6421  ctgccagttt aaatgaagca agacaagaac taagtgacaa agtaagagaa ctttccagat
6481  ctgctggcaa aacatccctt gtggaggagg cagaaaagca cgcgcggtcc ttacaagagc
6541  tggcaaagca gctggaagag atcaagagaa acgccagcgg ggatgagctg gtgcgctgtg
6601  ctgtggatgc cgccaccgcc tacgagaaca tcctcaatgc catcaaagcg ccgaggacg
6661  cagccaacag ggctgccagt gcatctgaat ctgccctcca gacagtgata aaggaagatc
6721  tgccaagaaa agctaaaacc ctgagttcca acagtgataa actgttaaat gaagccaaga
6781  tgacacaaaa gaagctaaag caagaagtca gtccagctct caacaaccta cagcaaaccc
6841  tgaatattgt gacagttcag aaagaagtga tagacaccaa tctcacaact ctccgagatg
6901  gtcttcatgg gatacagaga ggtgatattg atgctatgat cagtagtgca aagagcatgg
6961  tcagaaaggc caacgacatc acagatgagg ttctggatgg gctcaacccc atccagacag
7021  atgtggaaag aattaaggac acctatggga ggacacagaa cgaagacttc aaaaaggctc
7081  tgactgatgc agataactcg gtgaataagt taaccaacaa actacctgat ctttggcgca
7141  agattgaaag tatcaaccaa cagctgttgc ccttgggaaa catctctgac aacatggaca
7201  gaatacgaga actaattcag caggccagag atgctgccag taaggttgct gtccccatga
7261  ggttcaatgg taaatctgga gtcgaagtcc gactgccaaa tgacctggaa gatttgaaag
7321  gatatacatc tctgtccttg tttctccaaa ggcccaactc aagagaaaat gggggtactg
7381  agaatatgtt tgtgatgtac cttggaaata aagatgcctc ccgggactac atcggcatgg
7441  cagttgtgga tggccagctc acctgtgtct acaacctggg ggaccgtgag gctgaactcc
7501  aagtggacca gatcttgacc aagagtgaga ctaaggaggc agttatggat cgggtgaaat
7561  ttcagagaat ttatcagttt gcaaggctta attacaccaa aggagccaca tccagtaaac
7621  cagaaacacc cggagtctat gacatggatg gtagaaatag caatacactc cttaatttgg
7681  atcctgaaaa tgttgtattt tatgttggag gttacccacc tgattttaaa cttcccagtc
7741  gactaagttt ccctccatac aaaggttgta ttgaattaga tgacctcaat gaaaatgttc
7801  tgagcttgta caacttcaaa aaaacattca atctcaacac aactgaagtg gagccttgta
7861  gaaggaggaa ggaagagtca gacaaaaatt attttgaagg tacgggctat gctcgagttc
7921  caactcaacc acatgctccc atcccaacct tggacagac aattcagacc accgtggata
7981  gaggcttgct gttctttgca gaaaacgggg atcgcttcat atctctaaat atagaagatg
8041  gcaagctcat ggtgagatac aaactgaatt cagagctacc aaaagagaga ggagttggag
8101  acgccataaa caacggcaga gaccattcga ttcagatcaa aattggaaaa ctccaaaagc
8161  gtatgtggat aaatgtggac gttcaaaaca ctataattga tggtgaagta tttgatttca
8221  gcacatatta tctgggagga attccaattg caatcaggga agatttaac atttctacgc
8281  ctgctttccg aggctgcatg aaaaatttga agaaaccag tggtgtcgtt agattgaatg
8341  atactgtggg agtaaccaaa aagtgctcgg aagactggaa gcttgtgcga tctgcctcat
8401  tctccagagg aggacaattg agtttcactg atttgggctt accacctact gaccacctcc
8461  aggcctcatt tggatttcag acctttcaac ccagtggcat attattagat catcagacat
8521  ggacaaggaa cctgcaggtc actctggaag atggttacat tgaattgagc accagcgata
8581  gcggcagccc aatttttaaa tctccacaga cgtatatgga tggtttactg cattatgtat
8641  ctgtaataag cgacaactct ggactacggc ttctcatcga tgaccagctt ctgagaaata
8701  gcaaaaggct aaaacacatt tcaagttccc ggcagtctct cgtctgggc gggagcaatt
8761  ttgagggttg tattagcaat gttttgtcc agaggttatc actgagtcct gaagtcctag
```

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 8821 atttgaccag taactctctc aagagagatg tgtccctggg aggctgcagt ttaaacaaac
 8881 cacctttctt aatgttgctt aaaggttcta ccaggtttaa caagaccaag acttttcgta
 8941 tcaaccagct gttgcaggac acaccagtgg cctccccaag gagcgtgaag gtgtggcaag
 9001 atgcttgctc accacttccc aagacccagg ccaatcatgg agccctccag tttggggaca
 9061 ttcccaccag ccacttgcta ttcaagcttc ctcaggagct gctgaaaccc aggtcacagt
 9121 ttgctgtgga catgcagaca acatcctcca gaggactggt gtttcacacg ggcactaaga
 9181 actcctttat ggctctttat ctttcaaaag gacgtctggt ctttgcactg gggacagatg
 9241 ggaaaaaatt gaggatcaaa agcaaggaga aatgcaatga tgggaaatgg cacacggtgg
 9301 tgtttggcca tgatggggaa aaggggcgct tggttgtgga tggactgagg gcccgggagg
 9361 gaagtttgcc tggaaactcc accatcagca tcagagcgcc agtttacctg ggatcacctc
 9421 catcagggaa accaaagagc ctccccacaa acagctttgt gggatgcctg aagaactttc
 9481 agctggattc aaaacccttg tatacccctt cttcaagctt cggggtgtct tcctgcttgg
 9541 gtggtccttt ggagaaaggc atttatttct ctgaagaagg aggtcatgtc gtcttggctc
 9601 actctgtatt gttggggcca gaatttaagc ttgttttcag catccgccca agaagtctca
 9661 ctgggatcct aatacacatc ggaagtcagc ccgggaagca cttatgtgtt tacctggagg
 9721 caggaaaggt cacggcctct atggacagtg gggcaggtgg gacctcaacg tcggtcacac
 9781 caaagcagtc tctgtgtgat ggacagtggc actcggtggc agtcaccata aaacaacaca
 9841 tcctgcacct ggaactggac acagacagta gctacacagc tggacagatc cccttcccac
 9901 ctgccagcac tcaagagcca ctacaccttg gaggtgctcc agccaatttg acgacactga
 9961 ggatccctgt gtggaaatca ttctttggct gtctgaggaa tattcatgtc aatcacatcc
10021 ctgtccctgt cactgaagcc ttggaagtcc aggggcctgt cagtctgaat ggttgtcctg
10081 accagtaacc caagcctatt tcacagcaag gaaattcacc ttcaaagca ctgattaccc
10141 aatgcacctc cctccccagc tcgagatcat tcttcactca ggacacaaac cagacaggtt
10201 taatagcgaa tctaattttg aattctgacc atggataccc atcactttgg cattcagtgc
10261 tacatgtgta ttttatataa aaatcccatt tcttgaagat aaaaaaattg ttattcaaat
10321 tgttatgcac agaatgtttt tggtaatatt aatttccact aaaaaattaa atgtctttta
10381 agaaacattc ttttccactt gttaaaaaaa ttaaatatat tttaaagcac tttaagaata
10441 tgaaactttc atatatgtta aaggattata atttatggaa ttaaaaaatg cagtgtagtc
10501 cttaaaaaaa a
```

FIG._2C-4

MAAAARPRGRALGPVLPPTPLLLLVLRVLPACGATARDPGAAAG
LSLHPTYFNLAEAARIWATATCGERGPGEGRPQPELYCKLVGGPTAPGSGHTIQGQFC
DYCNSEDPRKAHPVTNAIDGSERWWQSPPLSSGTQYNRVNLTLDLGQLFHVAYILIKF
ANSPRPDLWVLERSVDFGSTYSPWQYFAHSKVDCLKEFGREANMAVTRDDDVLCVTEY
SRIVPLENGEVVVSLINGRPGAKNFTFSHTLREFTKATNIRLRFLRTNTLLGHLISKA
QRDPTVTRRYYYSIKDISIGGQCVCNGHAEVCNINNPEKLFRCECQHHTCGETCDRCC
TGYNQRRWRPAAWEQSHECEACNCHGHASNCYYDPDVERQQASLNTQGIYAGGGVCIN
CQHNTAGVNCEQCAKGYYRPYGVPVDAPDGCIPCSCDPEHADGCEQGSGRCHCKPNFH
GDNCEKCAIGYYNFPFCLRIPIFPVSTPSSEDPVAGDIKGCDCNLEGVLPEICDAHGR
CLCRPGVEGPRCDTCRSGFYSFPICQACWCSALGSYQMPCSSVTGQCECRPGVTGQRC
DRCLSGAYDFPHCQGSSSACDPAGTINSNLGYCQCKLHVEGPTCSRCKLLYWNLDKEN
PSGCSECKCHKAGTVSGTGECRQGDGDCHCKSHVGGDSCDTCEDGYFALEKSNYFGCQ
GCQCDIGGALSSMCSGPSGVCQCREHVVGKVCQRPENNYYFPDLHHMKYEIEDGSTPN
GRDLRFGFDPLAFPEFSWRGYAQMTSVQNDVRITLNVGKSSGSLFRVILRYVNPGTEA
VSGHITIYPSWGAAQSKEIIFLPSKEPAFVTVPGNGFADPFSITPGIWVACIKAEGVL
LDYLVLLPRDYYEASVLQLPVTEPCAYAGPPQENCLLYQHLPVTRFPCTLACEARHFL
LDGEPRPVAVRQPTPAHPVMVDLSGREVELHLRLRIPQVGHYVVVVEYSTEAAQLFVV
DVNVKSSGSVLAGQVNIYSCNYSVLCRSAVIDHMSRIAMYELLADADIQLKGHMARFL
LHQVCIIPIEEFSAEYVRPQVHCIASYGRFVNQSATCVSLAHETPPTALILDVLSGRP
FPHLPQQSSPSVDVLPGVTLKAPQNQVTLRGRVPHLGRYVFVIHFYQAAHPTFPAQVS
VDGGWPRAGSFHASFCPHVLGCRDQVIAEGQIEFDISEPEVAATVKVPEGKSLVLVRV
LVVPAENYDYQILHKKSMDKSLEFITNCGKNSFYLDPQTASRFCKNSARSLVAFYHKG
ALPCECHPTGATGPHCSPEGGQCPCQPNVIGRQCTRCATGHYGFPRCKPCSCGRRLCE
EMTGQCRCPPRTVRPQCEVCETHSFSFHPMAGCEGCNCSRRGTIEAAMPECDRDSGQC
RCKPRITGRQCDRCASGFYRFPECVPCNCNRDGTEPGVCDPGTGACLCKENVEGTECN
VCREGSFHLDPANLKGCTSCFCFGVNNQCHSSHKRRTKFVDMLGWHLETADRVDIPVS
FNPGSNSMVADLQELPATIHSASWVAPTSYLGDKVSSYGGYLTYQAKSFGLPGDMVLL
EKKPDVQLTGQHMSIIYEETNTPRPDRLHHGRVHVVEGNFRHASSRAPVSREELMTVL
SRLADVRIQGLYFTETQRLTLSEVGLEEASDTGSGRIALAVEICACPPAYAGDSCQGC
SPGYYRDHKGLYTGRCVPCNCNGHSNQCQDGSGICVNCQHNTAGEHCERCQEGYYGNA
VHGSCRACPCPHTNSFATGCVVNGGDVRCSCKAGYTGTQCERCAPGYFGNPQKFGGSC
QPCSCNSNGQLGSCHPLTGDCINQEPKDSSPAEECDDCDSCVMTLLNDLATMGEQLRL
VKSQLQGLSASAGLLEQMRHMETQAKDLRNQLLNYRSAISNHGSKIEGLERELTDLNQ
EFETLQEKAQVNSRKAQTLNNNVNRATQSAKELDVKIKNVIRNVHILLKQISGTDGEG
NNVPSGDFSREWAEAQRMMRELRNRNFGKHLREAEADKRESQLLNRIRTWQKTHQGE
NNGLANSIRDSLNEYEAKLSDLRARLQEAAAQAKQANGLNQENERALGAIQRQVKEIN
SLQSDFTKYLTTADSSLLQTNIALQLMEKSQKEYEKLAASLNEARQELSDKVRELSRS
AGKTSLVEEAEKHARSLQELAKQLEEIKRNASGDELVRCAVDAATAYENILNAIKAAE
DAANRAASASESALQTVIKEDLPRKAKTLSSNSDKLLNEAKMTQKKLKQEVSPALNNL
QQTLNIVTVQKEVIDTNLTTLRDGLHGIQRGDIDAMISSAKSMVRKANDITDEVLDGL
NPIQTDVERIKDTYGRTQNEDFKKALTDADNSVNKLTNKLPDLWRKIESINQQLLPLG
NISDNMDRIRELIQQARDAASKVAVPMRFNGKSGVEVRLPNDLEDLKGYTSLSLFLQR
PNSRENGGTENMFVMYLGNKDASRDYIGMAVVDGQLTCVYNLGDREAELQVDQILTKS
ETKEAVMDRVKFQRIYQFARLNYTKGATSSKPETPGVYDMDGRNSNTLLNLDPENVVF

FIG. 2D-1

YVGGYPPDFKLPSRLSFPPYKGCIELDDLNENVLSLYNFKKTFNLNTTEVEPCRRRKE
ESDKNYFEGTGYARVPTQPHAPIPTFGQTIQTTVDRGLLFFAENGDRFISLNIEDGKL
MVRYKLNSELPKERGVGDAINNGRDHSIQIKIGKLQKRMWINVDVQNTIIDGEVFDFS
TYYLGGIPIAIRERFNISTPAFRGCMKNLKKTSGVVRLNDTVGVTKKCSEDWKLVRSA
SFSRGGQLSFTDLGLPPTDHLQASFGFQTFQPSGILLDHQTWTRNLQVTLEDGYIELS
TSDSGSPIFKSPQTYMDGLLHYVSVISDNSGLRLLIDDQLLRNSKRLKHISSSRQSLR
LGGSNFEGCISNVFVQRLSLSPEVLDLTSNSLKRDVSLGGCSLNKPPFLMLLKGSTRF
NKTKTFRINQLLQDTPVASPRSVKVWQDACSPLPKTQANHGALQFGDIPTSHLLFKLP
QELLKPRSQFAVDMQTTSSRGLVFHTGTKNSFMALYLSKGRLVFALGTDGKKLRIKSK
EKCNDGKWHTVVFGHDGEKGRLVVDGLRAREGSLPGNSTISIRAPVYLGSPPSGKPKS
LPTNSFVGCLKNFQLDSKPLYTPSSSFGVSSCLGGPLEKGIYFSEEGGHVVLAHSVLL
GPEFKLVFSIRPRSLTGILIHIGSQPGKHLCVYLEAGKVTASMDSGAGGTSTSVTPKQ
SLCDGQWHSVAVTIKQHILHLELDTDSSYTAGQIPFPPASTQEPLHLGGAPANLTTLR
IPVWKSFFGCLRNIHVNHIPVPVTEALEVQGPVSLNGCPDQ"

FIG._2D-2

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   1  gggatgcctc cagcagtgag gcggtcagcc tgcagcatgg gatggctgtg gatctttggg
  61  gcagccctgg ggcagtgtct gggctacagt tcacagcagc aaagggtgcc atttcttcag
 121  cctcccggtc aaagtcaact gcaagcgagt tatgtggagt ttagacccag ccagggttgt
 181  agccctggat actatcggga tcataaaggc ttgtataccg gacggtgtgt ccctgcaat
 241  tgcaacggac attcaaatca atgccaggat ggctcaggca tatgtgttaa ctgtcagcac
 301  aacaccgcgg gagagcactg tgaacgctgc caggagggct actatggcaa cgccgtccac
 361  ggatcctgca gggcctgccc atgtcctcac actaacagct tgccactgg ctgtgtggtg
 421  aatgggggag acgtgcggtg ctcctgcaaa gctgggtaca caggaacaca gtgtgaaagg
 481  tgtgcaccgg gatatttcgg gaatccccag aaattcggag gtagctgcca accatgcagt
 541  tgtaacagca atggccagct gggcagctgt catcccctga ctggagactg cataaaccaa
 601  gaacccaaag atagcagccc tgcagaagaa tgtgatgatt gcgacagctg tgtgatgacc
 661  ctcctgaacg acctggccac catgggcgag cagctccgcc tggtcaagtc tcagctgcag
 721  ggcctgagtg ccagcgcagg gcttctggag cagatgaggc acatggagac ccaggccaag
 781  gacctgagga atcagttgct caactaccgt tctgccattt caaatcatgg atcaaaaata
 841  gaaggcctgg aaagagaact gactgatttg aatcaagaat ttgagacttt gcaagaaaag
 901  gctcaagtaa attccagaaa agcacaaaca ttaaacaaca atgttaatcg ggcaacacaa
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1021  aagcagatct ctgggacaga tggagaggga aacaacgtgc cttcaggtga cttttccaga
1081  gagtgggctg aagcccagcg catgatgagg gaactgcgga acaggaactt tggaaagcac
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1501  gaaaaattag ctgccagttt aaatgaagca agacaagaac taagtgacaa agtaagagaa
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1621  ttacaagagc tggcaaagca gctggaagag atcaagagaa acgccagcgg ggatgagctg
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1921  cagcaaaccc tgaatattgt gacagttcag aaagaagtga tagacaccaa tctcacaact
1981  ctccgagatg gtcttcatgg gatacagaga ggtgatattg atgctatgat cagtagtgca
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2521  atcggcatgg cagttgtgga tggccagctc acctgtgtct acaacctggg ggaccgtgag
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2701  tccagtaaac cagaaacacc cggagtctat gacatggatg gtagaaatag caatacactc
2761  cttaatttgg atcctgaaaa tgttgtattt tatgttggag gttacccacc tgatttttaaa
2821  cttcccagtc gactaagttt ccctccatac aaaggttgta ttgaattaga tgacctcaat
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3181  ggagttggag acgccataaa caacggcaga gaccattcga ttcagatcaa aattggaaaa
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3301  tttgatttca gcacatatta tctgggagga attccaattg caatcaggga aagatttaac
3361  atttctacgc ctgctttccg aggctgcatg aaaaatttga agaaaaccag tggtgtcgtt
3421  agattgaatg atactgtggg agtaaccaaa aagtgctcgg aagactggaa gcttgtgcga
3481  tctgcctcat tctccagagg aggacaattg agtttcactg atttgggctt accacctact
3541  gaccacctcc aggcctcatt tggatttcag acctttcaac ccagtggcat attattagat
3601  catcagacat ggacaaggaa cctgcaggtc actctggaag atggttacat tgaattgagc
3661  accagcgata gcggcagccc aattttaaa tctccacaga cgtatatgga tggtttactg
3721  cattatgtat ctgtaataag cgacaactct ggactacggc ttctcatcga tgaccagctt
3781  ctgagaaata gcaaaaggct aaaacacatt tcaagttccc ggcagtctct gcgtctgggc
3841  gggagcaatt ttgagggttg tattagcaat gttttttgtcc agaggttatc actgagtcct
3901  gaagtcctag atttgaccag taactctctc aagagagatg tgtccctggg aggctgcagt
3961  ttaaacaaac cacctttct aatgttgctt aaaggttcta ccaggtttaa caagaccaag
4021  acttttcgta tcaaccagct gttgcaggac acaccagtgg cctccccaag gagcgtgaag
4081  gtgtggcaag atgcttgctc accacttccc aagacccagg ccaatcatgg agccctccag
4141  tttggggaca ttcccaccag ccacttgcta ttcaagcttc ctcaggagct gctgaaaccc
4201  aggtcacagt ttgctgtgga catgcagaca acatcctcca gaggactggt gtttcacacg
4261  ggcactaaga actcctttat ggctctttat cttttcaaaag gacgtctggt ctttgcactg
4321  gggacagatg ggaaaaaatt gaggatcaaa agcaaggaga aatgcaatga tgggaaatgg
4381  cacacggtgg tgtttggcca tgatggggaa aaggggcgct tggttgtgga tggactgagg
4441  gcccgggagg gaagtttgcc tggaaactcc accatcagca tcagagcgcc agtttacctg
4501  ggatcacctc catcagggaa accaaagagc ctccccacaa acagctttgt gggatgcctg
4561  aagaactttc agctggattc aaaacccttg tatacccctt cttcaagctt cggggtgtct
4621  tcctgcttgg gtggtccttt ggagaaaggc atttatttct ctgaagaagg aggtcatgtc
4681  gtcttggctc actctgtatt gttggggcca gaatttaagc ttgtttttcag catccgccca
4741  agaagtctca ctgggatcct aatacacatc ggaagtcagc ccgggaagca cttatgtgtt
4801  tacctggagg caggaaaggt cacggcctct atggacagtg gggcaggtgg gacctcaacg
4861  tcggtcacac caaagcagtc tctgtgtgat ggacagtggc actcggtggc agtcaccata
4921  aaacaacaca tcctgcacct ggaactggac acagacagta gctacacagc tggacagatc
4981  cccttcccac ctgccagcac tcaagagcca ctacaccttg gaggtgctcc agccaatttg
5041  acgacactga ggatccctgt gtggaaatca ttctttggct gtctgaggaa tattcatgtc
5101  aatcacatcc ctgtccctgt cactgaagcc ttggaagtcc aggggcctgt cagtctgaat
5161  ggttgtcctg accagtaacc caagcctatt cacagcaag gaaattcacc ttcaaaagca
5221  ctgattaccc aatgcacctc cctccccagc tcgagatcat tcttcactca ggacacaaac
5281  cagacaggtt aatagcgaa tctaattttg aattctgacc atggataccc atcactttgg
5341  cattcagtgc tacatgtgta ttttatataa aaatcccatt tcttgaagat aaaaaaattg
5401  ttattcaaat tgttatgcac agaatgtttt tggtaatatt aatttccact aaaaaattaa
5461  atgtctttta agaaacattc ttttccactt gttaaaaaaa ttaaatatat tttaaagcac
5521  tttaagaata tgaaactttc atatatgtta aaggattata atttatggaa ttaaaaaatg
5581  cagtgtagtc cttaaaaaaa a
```

FIG._2E-2

MPPAVRRSACSMGWLWIFGAALGQCLGYSSQQQRVPFLQPPGQS
QLQASYVEFRPSQGCSPGYYRDHKGLYTGRCVPCNCNGHSNQCQDGSGICVNCQHNTA
GEHCERCQEGYYGNAVHGSCRACPCPHTNSFATGCVVNGGDVRCSCKAGYTGTQCERC
APGYFGNPQKFGGSCQPCSCNSNGQLGSCHPLTGDCINQEPKDSSPAEECDDCDSCVM
TLLNDLATMGEQLRLVKSQLQGLSASAGLLEQMRHMETQAKDLRNQLLNYRSAISNHG
SKIEGLERELTDLNQEFETLQEKAQVNSRKAQTLNNNVNRATQSAKELDVKIKNVIRN
VHILLKQISGTDGEGNNVPSGDFSREWAEAQRMMRELRNRNFGKHLREAEADKRESQL
LLNRIRTWQKTHQGENNGLANSIRDSLNEYEAKLSDLRARLQEAAAQAKQANGLNQEN
ERALGAIQRQVKEINSLQSDFTKYLTTADSSLLQTNIALQLMEKSQKEYEKLAASLNE
ARQELSDKVRELSRSAGKTSLVEEAEKHARSLQELAKQLEEIKRNASGDELVRCAVDA
ATAYENILNAIKAAEDAANRAASASESALQTVIKEDLPRKAKTLSSNSDKLLNEAKMT
QKKLKQEVSPALNNLQQTLNIVTVQKEVIDTNLTTLRDGLHGIQRGDIDAMISSAKSM
VRKANDITDEVLDGLNPIQTDVERIKDTYGRTQNEDFKKALTDADNSVNKLTNKLPDL
WRKIESINQQLLPLGNISDNMDRIRELIQQARDAASKVAVPMRFNGKSGVEVRLPNDL
EDLKGYTSLSLFLQRPNSRENGGTENMFVMYLGNKDASRDYIGMAVVDGQLTCVYNLG
DREAELQVDQILTKSETKEAVMDRVKFQRIYQFARLNYTKGATSSKPETPGVYDMDGR
NSNTLLNLDPENVVFYVGGYPPDFKLPSRLSFPPYKGCIELDDLNENVLSLYNFKKTF
NLNTTEVEPCRRRKEESDKNYFEGTGYARVPTQPHAPIPTFGQTIQTTVDRGLLFFAE
NGDRFISLNIEDGKLMVRYKLNSELPKERGVGDAINNGRDHSIQIKIGKLQKRMWINV
DVQNTIIDGEVFDFSTYYLGGIPIAIRERFNISTPAFRGCMKNLKKTSGVVRLNDTVG
VTKKCSEDWKLVRSASFSRGGQLSFTDLGLPPTDHLQASFGFQTFQPSGILLDHQTWT
RNLQVTLEDGYIELSTSDSGSPIFKSPQTYMDGLLHYVSVISDNSGLRLLIDDQLLRN
SKRLKHISSSRQSLRLGGSNFEGCISNVFVQRLSLSPEVLDLTSNSLKRDVSLGGCSL
NKPPFLMLLKGSTRFNKTKTFRINQLLQDTPVASPRSVKVWQDACSPLPKTQANHGAL
QFGDIPTSHLLFKLPQELLKPRSQFAVDMQTTSSRGLVFHTGTKNSFMALYLSKGRLV
FALGTDGKKLRIKSKEKCNDGKWHTVVFGHDGEKGRLVVDGLRAREGSLPGNSTISIR
APVYLGSPPSGKPKSLPTNSFVGCLKNFQLDSKPLYTPSSSFGVSSCLGGPLEKGIYF
SEEGGHVVLAHSVLLGPEFKLVFSIRPRSLTGILIHIGSQPGKHLCVYLEAGKVTASM
DSGAGGTSTSVTPKQSLCDGQWHSVAVTIKQHILHLELDTDSSYTAGQIPFPPASTQE
PLHLGGAPANLTTLRIPVWKSFFGCLRNIHVNHIPVPVTEALEVQGPVSLNGCPDQ

FIG._2F

```
   1 gtataagagg aagaacacaa aggtttgcag cagccaggca gaacaccaag ggatcaagat
  61 gccgcctaca gtgaggtggt cagcctggtg cacaggatgg ctgtggatct ttggggcagc
 121 tctgggccag tgcctggggt atggctcaga gcagcaaagg gtagcatttc ttcagcatcc
 181 agggcaaaac catctgcaag caagttatat ggagcttaga cccagccagg gctgtcgccc
 241 aggatactat cgagacatca aaagcttccc tgcgggaagg tctgttccct gcaattgcaa
 301 cggacattca aatagatgcc aagacggctc gggagtgtgc attaactgtc agcacaacac
 361 agctggggag cactgtgagc gttgcaagag gggttactat ggaagcgcca tccatggatc
 421 ctgcagggtt tgccctgtc ctcacaccaa cagctttgcc actggctgtg ctgtggatgg
 481 aggagctgtg aggtgtgcct gcaaaccgg atacacagga gcacagtgtg agaggtgtgc
 541 accaggatat tttgggaacc cccagaaatt tggaggtagc tgccaaccat gcaattgcaa
 601 cagtaatggc cagtttggca cttgtgatcc cctaactgga gactgtgtaa gccaagaacc
 661 caaagatggc agccctgcag aagaatgtga tgactgtgac agctgtgtga tgactctcct
 721 aaatgacttg gtccccatgg gtgaggaact cgccctggtg aaatcaaaac ttcaggggct
 781 gagtgtgaac actggttctc tggaacagat ccggcatgtg gagatgcagg ccaaggacct
 841 gaggaaccag ctgcttggct tccgttccgc catctccagt cacgggtccc aaatggacgg
 901 cctggaaaaa gaactcagtc atttgtacca ggaattcgaa actttgcaag aaaaggcgca
 961 ggtcaattcc agaaaagcac aaacattata taacaacatc gatacgacaa tccaaaacgc
1021 caaagagttg gacatgaaga ttaaaaacat acttacgaat gtgcacattc tcctgaagca
1081 gatcgctcgg ccaggtggag aaggaatgga cttgccggtg ggcgactggt ccagggagtc
1141 ggcggaagct cagcgcatgt tgcgggagct gcgaggccga gactttaaaa agcacctcca
1201 agaagcagag gcccagaaaa tggaagccca gctcttactg aaccgaatca ggacctggct
1261 ggaatcccac caggtggaga caatggact gctaaagaat attcgggatt cattaaatga
1321 ttatgaagcc aaacttcagg acctgcgttc cgtgcttcag gaggcggcag cccagggaaa
1381 gcaggctaca ggcctcaacc acgaaaatga gggggtccta ggagccatcc agagacaaat
1441 gaaggaaatg gattccctga gaagtacct caccgagcac ctggccacag cagacgcttc
1501 cctgctgcaa accaacagtc tactgcagcg gatggacacg agccagaagg agtatgaaag
1561 cttagctgct gctttaaacg gagcaagaca ggaactgaat gaccaagtgc gggaactctc
1621 cagatccgga ggcaaagcac ccctggtggc tgaggccgag aagcacgctc agtctttaca
1681 ggagctggca aagcagctgg aagagataaa gagaaacacc agtggggatg agtcggtgcg
1741 ctgtgtcgtg gacgctgcca ctgccatga gagcatcctc aacgccatcc agcagcaga
1801 ggatgcagcc ggcaaggccg acagtgcctc agagtccgcc ttccagacag tgataaagga
1861 agatcttccg agaagagcca aaaccctgag ttctgacagc gaggaactgt aaacgaggc
1921 caagatgaca cggaaaaggc tacagcaaga aatcaatcca gctctcaaca gcctacagca
1981 aaccctgaag actgtatcag ttcagaagga cctgctagat gccaatgtca ctgctgtccg
2041 taatgacctt cgtgggatcc agagaggtga tattgacagt gtggtgagtg gagcgaagag
2101 catggtcagg aaagccaatg gataacgag cgaggtcctg gacgggctca gccccatcca
2161 gacggatttg gaaggatta aggacagcta cgggagcaca cggcatgagg acttcaacaa
2221 agctctgatt gacgccaata actcagtaaa gaaattaacc aagaagttgc ctgatctttt
2281 tgtcaagatt gaaagcatca atcaacagtt gctgcccctg ggaaacatct ctgacaatgt
2341 agaccgaatc cgagagctca ttacgcaggc cagagatgct gcgaacaagg ttgcaattcc
2401 catgaggttc aatggtaaat ctggtgttga agtccgtctg ccaaatgacc tagaagactt
2461 gaagggatac acgtctctgt ctttgttcct ccaaagacca gacttaagag agaatggagg
2521 cactgaggac atgtttgtaa tgtaccttgg aaacaaggat gcctccaagg actacatcgg
2581 catggcggtt gtagatggcc agctgacgtg tgtctacaac ctgggggacc gagaagctga
2641 agttcagatc gatcaggtcc tgacggagag tgagtctcag gaggcagtta ggaccgggt
2701 gaagttccag agaatatatc aatttgccaa gcttaattac accaaagaag ccacgtccaa
2761 taaacccaaa gctcccgcgg tctacgacct ggagggtggc agtagcaaca cgctccttaa
2821 tttggatccc gaggacgctg tgttttatgt cggaggttac ccaccggatt ttgaacttcc
2881 tagcagactg cggttccctc catacaaagg ctgtatcgaa ctagatgacc tcaatgaaaa
```

```
2941  cgttctaagc ttgtacaatt tcaagacaac tttcaatctc aacaccacgg aggtggagcc
3001  ttgtaggagg agaaaggaag agtcagacaa aaattacttt gaaggtacag gctatgctcg
3061  catccctact caaccaaatg ctcccttccc aaacttcata cagaccatcc agactactgt
3121  ggacagaggt ttactgttct tcgcagaaaa ccaggataac ttcatatctc tgaacataga
3181  agatggcaat ctcatggtga gatacaaact aaattcagag ccacccaaag agaagggaat
3241  tcgagacacc atcaacgatg ggaaagatca ttcgatctta atcacaattg gaaaactaca
3301  aaaacgcatg tggataaatg tgaacgaacg cagtgtacga atcgaagggg aaatatttga
3361  tttcagcaca tattatttgg gcggaattcc aattgcaatc agagaaaggt ttaacatctc
3421  aacgcctgct ttccaaggct gcatgaagaa tctgaagaaa accagtgggg ttgtcaggtt
3481  gaatgatact gtgggtgtaa ccaagaagtg ctcagaagac tggaagcttg tgcgaaccgc
3541  ctcgttctcc agaggagggc agatgagctt tacaaacttg gacgtgccct cgactgaccg
3601  cttccagctc tcctttgggt ttcagacctt tcaacccagt ggcacactgc tcaatcatca
3661  gacgcggaca agcagcctgc tggtcaccct ggaagatggg cacattgagt tgagcactag
3721  ggacagcaac atcccaattt tcaagtctcc agggacctac atggacggtt tactgcatca
3781  tgtatctgta ataagtgaca cctcaggtct ccgccttctc atcgatgacc aggtcctgag
3841  aaggaaccag aggcttccta gcttctctaa cgcccagcag tcgctccgcc ttggaggagg
3901  tcatttcgag ggttgtatca gcaatgtttt agtccaaagg ttttcacaga gtccagaagt
3961  cctggatctg gccagtaaat ctaccaagaa ggatgcatcc ctaggaggct gcagtttaaa
4021  caagccacct tttcttatgt tgtttaaaag tcccaagaga tttaacaagg gccggatttt
4081  caatgttaat cagctgatgc aagatgcacc tcaggccaca aggagcacag aggcttggca
4141  agatgggagg tcctgcctac cacctctgaa caccaaggcc tctcacagag ccctgcagtt
4201  tggagacagc cccaccagcc acttgctact caagcttccc caggaactgc tgaaacctag
4261  gtcacagttt tctttagaca tacagacaac ttccccccaaa ggactggtgt tttacgcagg
4321  caccaaggac tccttcctgg ctctttatgt cgcagatggc cgtgttgtct ttgctttggg
4381  ggcaggaggg aagaaactga gactcaggag caaggagaga taccatgacg ggaagtggca
4441  cacggtggtg ttcggactaa atggaggaaa ggcacgcctg gttgtggatg ggctaagggc
4501  ccaggaaggc agtttgcctg gaaattctac catcagcccc agagaacagg tttacctagg
4561  gttgccgcta tcaagaaagc caaagagcct accccagcac agttttgtgg ggtgcctgag
4621  agatttccag ttgaactcga aacccctgga ttctccttct gcgaggtttg gggtatctcc
4681  ctgcttgggt ggctctttag agaaaggcat ttatttctcc caaggaggag gccatgtgat
4741  cctagccaat tctgtgtcct tggggccaga gcttaagctc actttcagca ttcgcccacg
4801  gagtctcact ggggtcttaa tacacgtcgg aagtcaatct ggacagcgct taagtgtgta
4861  catggaggca ggaaaggtca caacctctgt gagcagtgat gcaggaggaa gtgtgacatc
4921  aattacaccg aagcagtctc tgtgtgatgg acagtggcac tcggtggcag ctccattaa
4981  acagcgcatc ctgcatctag aactggatac agacagtagc tacacagtcg caccactttc
5041  cttctcacca aacagcaccc gagggtcact gcacgtcgga ggtgtcccag acaaattgaa
5101  aatgcttaca ctccctgtgt ggaactcatt ttttggctgt ctgaagaata ttcaagtcaa
5161  ccatgtccct gtccccatca cagaagccac agaagtccaa ggttctgtca gcctgaatgg
5221  ctgccctgac cactaaccct acacagcaag attcaccttt ggag
```

FIG._2G-2

MPPTVRWSAWCTGWLWIFGAALGQCLGYGSEQQRVAFLQHPGQN
HLQASYMELRPSQGCRPGYYRDIKSFPAGRSVPCNCNGHSNRCQDGSGVCINCQHNTA
GEHCERCKRGYYGSAIHGSCRVCPCPHTNSFATGCAVDGGAVRCACKPGYTGAQCERC
APGYFGNPQKFGGSCQPCNCNSNGQFGTCDPLTGDCVSQEPKDGSPAEECDDCDSCVM
TLLNDLVPMGEELALVKSKLQGLSVNTGSLEQIRHVEMQAKDLRNQLLGFRSAISSHG
SQMDGLEKELSHLYQEFETLQEKAQVNSRKAQTLYNNIDTTIQNAKELDMKIKNILTN
VHILLKQIARPGGEGMDLPVGDWSRESAEAQRMLRELRGRDFKKHLQEAEAQKMEAQL
LLNRIRTWLESHQVENNGLLKNIRDSLNDYEAKLQDLRSVLQEAAAQGKQATGLNHEN
EGVLGAIQRQMKEMDSLKKYLTEHLATADASLLQTNSLLQRMDTSQKEYESLAAALNG
ARQELNDQVRELSRSGGKAPLVAEAEKHAQSLQELAKQLEEIKRNTSGDESVRCVVDA
ATAYESILNAIRAAEDAAGKADSASESAFQTVIKEDLPRRAKTLSSDSEELLNEAKMT
RKRLQQEINPALNSLQQTLKTVSVQKDLLDANVTAVRNDLRGIQRGDIDSVVSGAKSM
VRKANGITSEVLDGLSPIQTDLGRIKDSYGSTRHEDFNKALIDANNSVKKLTKKLPDL
FVKIESINQQLLPLGNISDNVDRIRELITQARDAANKVAIPMRFNGKSGVEVRLPNDL
EDLKGYTSLSLFLQRPDLRENGGTEDMFVMYLGNKDASKDYIGMAVVDGQLTCVYNLG
DREAEVQIDQVLTESESQEAVMDRVKFQRIYQFAKLNYTKEATSNKPKAPAVYDLEGG
SSNTLLNLDPEDAVFYVGGYPPDFELPSRLRFPPYKGCIELDDLNENVLSLYNFKTTF
NLNTTEVEPCRRRKEESDKNYFEGTGYARIPTQPNAPFPNFIQTIQTTVDRGLLFFAE
NQDNFISLNIEDGNLMVRYKLNSEPPKEKGIRDTINDKDHSILITIGKLQKRMWINV
NERSVRIEGEIFDFSTYYLGGIPIAIRERFNISTPAFQGCMKNLKKTSGVVRLNDTVG
VTKKCSEDWKLVRTASFSRGGQMSFTNLDVPSTDRFQLSFGFQTFQPSGTLLNHQTRT
SSLLVTLEDGHIELSTRDSNIPIFKSPGTYMDGLLHHVSVISDTSGLRLLIDDQVLRR
NQRLPSFSNAQQSLRLGGGHFEGCISNVLVQRFSQSPEVLDLASKSTKKDASLGGCSL
NKPPFLMLFKSPKRFNKGRIFNVNQLMQDAPQATRSTEAWQDGRSCLPPLNTKASHRA
LQFGDSPTSHLLLKLPQELLKPRSQFSLDIQTTSPKGLVFYAGTKDSFLALYVADGRV
VFALGAGGKKLRLRSKERYHDGKWHTVVFGLNGGKARLVVDGLRAQEGSLPGNSTISP
REQVYLGLPLSRKPKSLPQHSFVGCLRDFQLNSKPLDSPSARFGVSPCLGGSLEKGIY
FSQGGGHVILANSVSLGPELKLTFSIRPRSLTGVLIHVGSQSGQRLSVYMEAGKVTTS
VSSDAGGSVTSITPKQSLCDGQWHSVAVSIKQRILHLELDTDSSYTVAPLSFSPNSTR
GSLHVGGVPDKLKMLTLPVWNSFFGCLKNIQVNHVPVPITEATEVQGSVSLNGCPDH

FIG._2H

```
   1 atgtcagagg gcatttgctg ccgagctggc gcactgtgca agagtggaca gcaagtttcc
  61 actgtggtgg tggtagatcc accaaaccat gccagtggaa tgagaactga atgcagccca
 121 ccagagcacg tgcacacgtg cattaaggaa cctcagaatc agctcttcca tgtggcttat
 181 atcttaatca aatttgcaaa ctctccccgc cctgatcttt ggatcctgga aagatctgta
 241 gactttggaa gcacctactc accatggcag tattttgctc attctagaag agattgtgta
 301 gaacagtttg ggcaagaagc aaacatggca attacccagg acgaccagat gctctgtgtc
 361 acggagtatt cccgtatcgt gcctctggaa aatggcgaga ttgttgtatc cttgataaat
 421 ggtcgtccag gtgcaaaaaa gtttgctttc tctgacactc tgagggagtt tactaaggca
 481 acaaacatcc gcttgcggtt tctgcgaacc aacaccctcc tcgggcatct tatttccaag
 541 gcagagcgag accccactgt cacgcgccgg tattattgca tggaagctga tgatgctctg
 601 ttctctgtcc tgcagtatta ttacagcata aaggatatca gtgttggtgg cggtgtgtt
 661 tgcaacggcc atgcggaggc gtgcagtgct gacaaccctg aaaagcagtt ccgatgcgaa
 721 tgccagcacc atacctgtgg agacacgtgt aaccgctgct gtgcaggtta caatcagagg
 781 cgctggcagc ctgctggtca ggagcagcac aatgagtgtg aagcctgcaa ctgccatggg
 841 catgctgtgg actgctacta tgacccagac gtggagcacc agcaggcgag cttgaacagc
 901 aaaggcgtct acgcaggtgg aggggtctgc atcaactgtc agcacaacac tgcaggcgtg
 961 aactgtgaaa agtgtgcgaa gggttacttc cggccccatg agttccggt ggatgcactg
1021 catggatgca tcccttgcag ctgtgaccca gaacgcgcag atgactgtga ccagggctca
1081 ggccactgcc attgtaagcc aaatttctcc ggagactact gtgagacgtg tgcagatggg
1141 tactataatt ttccattttg cttgagaatt ccagtctttc caactacac tccaagtcca
1201 gaagatccag tggctggcaa tataaaaggc aaggatccag ggactctaga cccaccagtc
1261 atagcaaatg gggcatatct tggagcttca agactagagc aaggagccac aggccagggc
1321 agccctgctg agagggtcac ccacaccaac tcatggctga gttcctcaat gcctatgctc
1381 caggttaggg ctgccatcca tgaggctaag tgttactctc tgtgtttctg tatgtatgtt
1441 gagcacagtg ggactgtacc acctgctctg gggtcaggtt atacagggga ctctgagcct
1501 aaaacaggaa cccaggcaaa aaggggggtgt gactgtaact ggaaggtgt ctcccagag
1561 atatgtgacg atcgtggcag gtgcctgtgc cgccctgggg ttgagggtcc ccagtgtgac
1621 tcctgccgct cgggctccta ttcatttccc atatgccaag cttgccagtg ttcgacgatt
1681 ggatcctatc cagtgccctg tgacccgggg aatggccagt gtgactgcct gcctggaatt
1741 accgggaggc agtgtgacag gtgtctctcg ggagcctatg actttccata ctgccaaggt
1801 aaggaagccg gcagcatgtt ggaggctcgg tcctcatctg agtgggtgca gctgacctct
1861 tggagaagcc tgggttattg tcagtgcaag cagcatgttg caagtcctac atgtagtgtc
1921 tgcaaaccat tatattggaa tctggccaaa gaaaacccc gtggatgctc agagtgccag
1981 tgccatgaag cagggacatt gagtggaatt ggagagtgtg ggcaggagga cggtgactgt
2041 agctgcaaag cccatgtaac tggtgatgcc tgcgacacct gtgaagatgg gttttttctct
2101 ttggagaaga gcaattactt tggctgtcaa gggtgtcagt gtgacattgg tggagcactc
2161 accaccatgt gtagtgggcc ctcgggagta tgccagtgca gagagcacgt ggaggggaaa
2221 cagtgccaga ggcctgaaaa taactactac ttcccggatt gcaccacat gaagtatgag
2281 gtcgaagatg cactggacc taatggaaga aacctgcggt ttggatttga tccccctggta
2341 ttccctgagt ttagctggag aggatatgct ccaatgacct cagtccaggt atatatgagt
2401 gagtgtgtgt gtcctctaca ctgcatgtta ttttggggta cttttcagaa tgaagtaagg
2461 gtgagattgt ctgtgaggca gtccagcctc ccttgttcc gcatcgttct gagatacatc
2521 agtcctggaa cggaagccat atccggccga atcactcttt actcatcgca gggagattcg
2581 gatgctttgc aaagcagaaa aatcaccttt cccccgagta aagagccagc ctttgtcaca
2641 gtccctggga atggctttgc aggcccattc tccatcacac tgggacgtg gattgcttgc
2701 atccaggtgg aaggagtcct tctggactac ctggtgctgc ttcccaggga ctactatgaa
2761 gcattcaccc tgcaagtgcc agtcacagag ccatgtgccc acacaggatc tccccaggac
2821 aactgtttgc tttaccagca tttaccactg actgcattct cctgtaccct ggcttgtgag
2881 gccagacact tcctgctgga tggagagctg agaccttgg caatgaggca gcccacaccc
```

FIG 21.1

```
2941  acacacccag  ccatggtgga  cctcagcggg  agagaggtag  aactgcagct  tcgtctgcgg
3001  gtcccacagg  ttggccacta  cgtggtcctg  ctggagtatg  ccacggaggt  ggagcagctt
3061  tttgtggtgg  acgtgaatct  gaagagctca  gggtctgcct  tggcaggcca  ggtgaacata
3121  tacagctgca  agtacagcat  cccgtgcagg  agtgtggtga  ttgacagcct  gagtcgcacg
3181  gctgtacatg  agctgttggc  agatgcagac  attcagctca  aggcgcacat  ggcccatttc
3241  cttttgtatc  acatttgtat  tataccagct  gaagaattct  caactgaata  tttgagacct
3301  caagtccact  gcattgccag  ctacaggcag  catgctaatc  caagtgcttc  ctgtgtctcc
3361  ctggcccatg  aaactcctcc  aacagcctca  attttggatg  ctacaagtag  gggccttttc
3421  tctgccctac  ctcatgagcc  ttcctctcct  gcagatggag  ttactctgaa  ggcaccacag
3481  agtcaagtga  ccctgaaagg  actcatacca  cacctgggcc  gacacgtctt  tgtcatccat
3541  ttttatcaag  cagagcaccc  agggtttccc  actgaggtga  ttgtgaatgg  aggaagacag
3601  tggtcaggtt  ccttccttgc  ctccttctgt  ccccacttac  ttggctgccg  ggaccaggtg
3661  atctctgatg  gccaagtgga  gtttgacatc  tctgaagcag  aggtagctgt  gacagtgaag
3721  attccagatg  gaaagtcctt  aacattggtc  cgggttctag  tggtacctgc  agagaattac
3781  gactaccaaa  ttcttcacaa  aacaacagtg  gacaagtcct  ccgagttcat  cagcagttgt
3841  ggaggagaca  gcttttatat  tgatccccag  gcagcctctg  gattctgtaa  gaattctgca
3901  aggtccctgg  tagccttta  ccataacggt  gccataccct  gtgagtgcga  ccctgctggg
3961  actgccggcc  accactgtag  tcctgagggt  gggcagtgcc  cttgccggcc  caatgtcatc
4021  gggaggcagt  gcagccgctg  tgcgacaggc  tactatggat  tcccatactg  caagccttgt
4081  aattgtggca  gacgcctttg  tgaagaggtg  acaggaagt  gtctctgccc  accccacaca
4141  gtcaggcctc  agtgtgaggt  ctgtgagatg  aattccttca  actttcaccc  tgtggctggc
4201  tgtgacgtct  gcaactgctc  caggaagggc  accattgagg  cggccgtctc  tgagtgtgac
4261  agggacagcg  ggcagtgcag  gtgcaagcct  agagtcacag  ggcagcagtg  tgacaagtgt
4321  gctcctggct  tctaccagtt  ccctgagtgt  gtccctgca  gctgtaacag  agatgggact
4381  gagcccagcg  tatgtgaccc  agagactggg  gcttgcatgt  gcaaggaaaa  tgtagagggc
4441  ccccaatgtc  aactgtgtcg  agaaggatca  ttctacctgg  acccaacaaa  cccaaagggt
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4621  gtgtccttca  accctggcag  caacagcatg  gtggcagatc  tgcaggagct  gccaccctca
4681  gttcacagtg  catcctgggt  ggcacctcca  tcctacctag  gtgataaggt  atcatcgtac
4741  ggcggctacc  tcacctacca  cgccaagtcc  tttggcttac  ctggagatat  ggttcttctg
4801  ggaaagcagc  cagatgtgca  gctcactggt  caacacatgt  ccctcatcca  taaggaaccc
4861  agcgacccac  ggccagacag  gctgcatcac  ggaagagtgc  aagtgattga  gggaaacttc
4921  agacacgaag  gcagcagtgc  cccagtgtcc  cgggaggagc  tgatgactgt  gctgtccaga
4981  ctggaaagac  tccacatccg  gggcctccat  ttcaccgaga  cacagcggct  caccttgggt
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5161  tattgggaca  acaaaagctt  acctgtagga  aggtgtgttc  cctgcaattg  caacggacat
5221  tcaaatagat  gccaggatgg  ctccgggata  tgcattaact  gtcagcacaa  cacagctggg
5281  gagcactgtg  agcgttgcca  agcaggtcac  tatggaaatg  ccatccacgg  atcttgtagg
5341  gtctgcccct  gccctcatac  caacagtttt  gccaccggct  gtgctgtgga  tggtggagct
5401  gtgaggtgtg  cctgcaaacc  cggatacaca  ggaacacagt  gtgagaggtg  tgcaccagga
5461  tattttggga  acccccagaa  atttggaggt  agctgccagc  catgcaattg  taacagcaat
5521  ggccagttag  gtccttgcga  cccctaact  ggagactgtg  taaaccaaga  acccaaagat
5581  ggcagccctg  cagaagaatg  tgatgactgc  gacagctgtg  tgatgacgct  cttaaatgac
5641  ttggcctcca  tgggtgagga  actccgcctg  gtgaagtcaa  agctgcaggg  gctgagtgtg
5701  agcacgggtg  ctctggaaca  gatccggcac  atggagacgc  aggccaagga  cctgaggaac
5761  cagctgcttg  gcttccgttc  tgccacctca  agtcatgggt  ccaaaatgga  tgacctggaa
5821  aaagagctga  gtcatttgaa  ccgggaattt  gaaactctgc  aagaaaaggc  acaggtcaat
```

```
5881  tccagaaaag cacaaacatt atataacaac attgatcaga caatccaaag tgccaaagaa
5941  ctggacatga agattaaaaa catcgttcag aatgtgcaca ttctcctgaa gcagatggcg
6001  aggccaggtg gagaaggcac ggacttgcca gtgggtgact ggtccaggga gctggccgaa
6061  gctcaacgca tgatgcgaga cctgcgaagc cgagacttta aaaagcacct ccaagaagca
6121  gaggccgaga aaatggaagc ccagctctta ctgcaccgga tcaggacctg gctggaatcc
6181  caccaggtgg agaacaacgg actgctaaag aatattcggg actccttaaa tgattatgaa
6241  gacaaacttc aggacctacg ttccatcctc caggaggcag ctgcccaggc aaagcaggcc
6301  actggcatca accatgaaaa tgagggggtt ctcggagcca tccagagaca aatgaaagaa
6361  atggattccc tgaagaatga cttcaccaag tacctggcca cagccgactc ttccctgctg
6421  cagaccaaca atctactgca gcagatggac aaaagccaga aggaatatga agcttagct
6481  gctgctttaa atggagcaag acaggaactg agtgacagag tgcgagaact gtccagatcg
6541  ggtggcaaag caccgctggt ggtggaggca gagaagcatg cacagtcttt acaggagctg
6601  gcaaagcagc tggaagagat aaagagaaac accagcgggg atgagctggt gcgttgtgct
6661  gtggatgctg ccacggccta tgagaacatc ctcaatgcca tcagagcagc agaggatgca
6721  gccagcaagg ccaccagtgc ctccaagtct gccttccaaa cagtgataaa ggaagacctt
6781  ccaaaaagag ctaagaccct gagttctgac agcgaggaac tgttaaatga agccaagatg
6841  acacagaaaa ggctacagca agtcagtcca gctctcaaca gcctacaaca aaccctgaag
6901  actgtatcag ttcagaagga cctgctagat gccaacctca ctgttgcccg tgatgatctt
6961  catgggatac agagaggtga tatcgacagt gtggtgatcg gtgcaaagag catggtcagg
7021  gaagccaacg gaataacaag cgaggtcctg gacgggctca accccatcca gacagatttg
7081  ggaaggatta aggacagcta tgagagcgca cggcgtgaag acttcagcaa ggctctggtc
7141  gatgccaata actcagtaaa gaaattaacc aggaagttgc ctgatctttt tatcaagatt
7201  gaaagtatca accaacagtt gctgcccctg gggaacatct ctgacaatgt ggaccgaatc
7261  cgagaactca ttcagcaggc cagagatgct gcaaacaagg tgggtattcc catttggctc
7321  tag
```

FIG._2I-3

MSEGICCRAGALCKSGQQVSTVVVVDPPNHASGMRTECSPPEHV
HTCIKEPQNQLFHVAYILIKFANSPRPDLWILERSVDFGSTYSPWQYFAHSRRDCVEQ
FGQEANMAITQDDQMLCVTEYSRIVPLENGEIVVSLINGRPAKKFAFSDTLREFTKA
TNIRLRFLRTNTLLGHLISKAERDPTVTRRYYCMEADDALFSVLQYYYSIKDISVGGR
CVCNGHAEACSADNPEKQFRCECQHHTCGDTCNRCCAGYNQRRWQPAGQEQHNECEAC
NCHGHAVDCYYDPDVEHQQASLNSKGVYAGGGVCINCQHNTAGVNCEKCAKGYFRPHG
VPVDALHGCIPCSCDPERADDCDQGSGHCHCKPNFSGDYCETCADGYYNFPFCLRIPV
FPNYTPSPEDPVAGNIKGKDPGTLDPPVIANGAYLGASRLEQGATGQGSPAERVTHTN
SWLSSSMPMLQVRAAIHEAKCYSLCFCMYVEHSGTVPPALGSGYTGDSEPKTGTQAKR
GCDCNLEGVLPEICDDRGRCLCRPGVEGPQCDSCRSGSYSFPICQACQCSTIGSYPVP
CDPGNGQCDCLPGITGRQCDRCLSGAYDFPYCQGKEAGSMLEARSSSEWVQLTSWRSL
GYCQCKQHVASPTCSVCKPLYWNLAKENPRGCSECQCHEAGTLSGIGECGQEDGDCSC
KAHVTGDACDTCEDGFFSLEKSNYFGCQGCQCDIGGALTTMCSGPSGVCQCREHVEGK
QCQRPENNYYFPDLHHMKYEVEDGTGPNGRNLRFGFDPLVFPEFSWRGYAPMTSVQVY
MSECVCPLHCMLFWGTFQNEVRVRLSVRQSSLSLFRIVLRYISPGTEAISGRITLYSS
QGDSDALQSRKITFPPSKEPAFVTVPGNGFAGPFSITPGTWIACIQVEGVLLDYLVLL
PRDYYEAFTLQVPVTEPCAHTGSPQDNCLLYQHLPLTAFSCTLACEARHFLLDGELRP
LAMRQPTPTHPAMVDLSGREVELQLRLRVPQVGHYVVLLEYATEVEQLFVVDVNLKSS
GSALAGQVNIYSCKYSIPCRSVVIDSLSRTAVHELLADADIQLKAHMAHFLLYHICII
PAEEFSTEYLRPQVHCIASYRQHANPSASCVSLAHETPPTASILDATSRGLFSALPHE
PSSPADGVTLKAPQSQVTLKGLIPHLGRHVFVIHFYQAEHPGFPTEVIVNGGRQWSGS
FLASFCPHLLGCRDQVISDGQVEFDISEAEVAVTVKIPDGKSLTLVRVLVVPAENYDY
QILHKTTVDKSSEFISSCGGDSFYIDPQAASGFCKNSARSLVAFYHNGAIPCECDPAG
TAGHHCSPEGGQCPCRPNVIGRQCSRCATGYYGFPYCKPCNCGRRLCEEVTGKCLCPP
HTVRPQCEVCEMNSFNFHPVAGCDVCNCSRKGTIEAAVSECDRDSGQCRCKPRVTGQQ
CDKCAPGFYQFPECVPCSCNRDGTEPSVCDPETGACMCKENVEGPQCQLCREGSFYLD
PTNPKGCTKCFCFGVNTDCQSSHKQRAKFVDMMGWRLETADGVDVPVSFNPGSNSMVA
DLQELPPSVHSASWVAPPSYLGDKVSSYGGYLTYHAKSFGLPGDMVLLGKQPDVQLTG
QHMSLIHKEPSDPRPDRLHHGRVQVIEGNFRHEGSSAPVSREELMTVLSRLERLHIRG
LHFTETQRLTLGEVGLEEASDTGSGPRAHLVEMCACPPDYTGDSCQGCRPGYYWDNKS
LPVGRCVPCNCNGHSNRCQDGSGICINCQHNTAGEHCERCQAGHYGNAIHGSCRVPC
PHTNSFATGCAVDGGAVRCACKPGYTGTQCERCAPGYFGNPQKFGGSCQPCNCNSNGQ
LGPCDPLTGDCVNQEPKDGSPAEECDDCDSCVMTLLNDLASMGEELRLVKSKLQGLSV
STGALEQIRHMETQAKDLRNQLLGFRSATSSHGSKMDDLEKELSHLNREFETLQEKAQ
VNSRKAQTLYNNIDQTIQSAKELDMKIKNIVQNVHILLKQMARPGGEGTDLPVGDWSR
ELAEAQRMMRDLRSRDFKKHLQEAEAEKMEAQLLLHRIRTWLESHQVENNGLLKNIRD
SLNDYEDKLQDLRSILQEAAAQAKQATGINHENEGVLGAIQRQMKEMDSLKNDFTKYL
ATADSSLLQTNNLLQQMDKSQKEYESLAAALNGARQELSDRVRELSRSGGKAPLVVEA
EKHAQSLQELAKQLEEIKRNTSGDELVRCAVDAATAYENILNAIRAAEDAASKATSAS
KSAFQTVIKEDLPKRAKTLSSDSEELLNEAKMTQKRLQQVSPALNSLQQTLKTVSVQK
DLLDANLTVARDDLHGIQRGDIDSVVIGAKSMVREANGITSEVLDGLNPIQTDLGRIK
DSYESARREDFSKALVDANNSVKKLTRKLPDLFIKIESINQQLLPLGNISDNVDRIRE
LIQQARDAANKVGIPIWL"

FIG._2J

CSPLPKTQANHGALQFGDIPTSHLLFKLPQELLKPRSQFAVDMQTTSSRGLVFHTGTKNSFMAL
YLSKGRLVFALGTDGKKLRIKSKEKCNDGKWHTVVFGHDGEKGRLVVDGLRAREGSLPGNSTIS
IRAPVYLGSPPSGKPKSLPTNSFVGCLKNFQLDSKPLYTPSSSFGVSSCLGGPLEKGIYFSEEG
GHVVLAHSVLLGPEFKLVFSIRPRSLTGILIHIGSQPGKHLCVYLEAGKVTASMDSGAGGTSTS
VTPKQSLCDGQWHSVAVTIKQHILHLELDTDSSYTAGQIPFPPASTQEPLHLGGAPANLTTLRI
PVWKSFFGCLRNIHVNHIPVPVTEALEVQGPVSLNGCPDQ

FIG._3A

```
t gctcaccact tcccaagacc caggccaatc atggagccct ccagtttggg
gacattccca ccagccactt gctattcaag cttcctcagg agctgctgaa
acccaggtca cagtttgctg tggacatgca dacaacatcc tccagaggac
tggtgtttca cacgggcact aagaactcct ttatggctct ttatctttca
aaaggacgtc tggtctttgc actggggaca gatgggaaaa aattgaggat
caaaagcaag gagaaatgca atgatgggaa atggcacacg gtggtgtttg
gccatgatgg ggaaaagggg cgcttggttg tggatggact gagggcccgg
gagggaagtt tgcctggaaa ctccaccatc agcatcagag cgccagttta
cctgggatca cctccatcag ggaaaccaaa gagcctcccc acaaacagct
ttgtgggatg cctgaagaac tttcagctgg attcaaaacc cttgtatacc
ccttcttcaa gcttcggggt gtcttcctgc ttgggtggtc ctttggagaa
aggcatttat ttctctgaag aaggaggtca tgtcgtcttg gctcactctg
tattgttggg gccagaattt aagcttgttt tcagcatccg cccaagaagt
ctcactggga tcctaataca catcggaagt cagcccggga agcacttatg
tgtttacctg gaggcaggaa aggtcacggc tctctatggac agtggggcag
gtgggacctc aacgtcggtc acaccaaagc agtctctgtg tgatggacag
tggcactcgg tggcagtcac cataaaacaa cacatcctgc acctggaact
ggacacagac agtagctaca cagctggaca gatcccctttc ccacctgcca
gcactcaaga gccactacac cttggaggtg ctccagccaa tttgacgaca
ctgaggatcc ctgtgtggaa atcattcttt ggctgtctga ggaatattca
tgtcaatcac atccctgtcc ctgtcactga gccttggaa gtccaggggc
ctgtcagtct gaatggttgt cctgaccagt aacccaagcc tatttcacag
caaggaaatt caccttcaaa agcactgatt acccaatgca cctccctccc
cagctcgaga tcattcttca attaggacac aaaccagaca ggtttaatag
cgaatctaat tttgaattct gaccatggat acccatcact ttggcattca
gtgctacatg tgtattttat ataaaaatcc catttcttga agataaaaaa
attgttattc aaattgttat gcacagaatg tttttggtaa tattaatttc
cactaaaaaa ttaaatgtct
```

FIG._3B

CLGGPLEKGIYFSEEGGHVVLAHSVLLGPEFKLVFSIRPRSLTGILIHIGSQPGKHLCVYLEAG
KVTASMDSGAGGTSTSVTPKQSLCDGQWHSVAVTIKQHILHLELDTDSSYTAGQIPFPPASTQE
PLHLGGAPANLTTLRIPVWKSFFGCLRNIHVNHIPVPVTEALEVQGPVSLNGCPDQ

FIG._3C

tgc ttgggtggtc ctttggagaa aggcatttat ttctctgaag aaggaggtca
tgtcgtcttg gctcactctg tattgttggg gccagaattt aagcttgttt
tcagcatccg cccaagaagt ctcactggga tcctaataca catcggaagt
cagcccggga agcacttatg tgtttacctg gaggcaggaa aggtcacggc
ctctatggac agtggggcag gtgggacctc aacgtcggtc acaccaaagc
agtctctgtg tgatggacag tggcactcgg tggcagtcac cataaaacaa
cacatcctgc acctggaact ggacacagac agtagctaca cagctggaca
gatcccсttc ccacctgcca gcactcaaga gccactacac cttggaggtg
ctccagccaa tttgacgaca ctgaggatcc ctgtgtggaa atcattcttt
ggctgtctga ggaatattca tgtcaatcac atccctgtcc ctgtcactga
agccttggaa gtccaggggc ctgtcagtct gaatggttgt cctgaccagt
aacccaagcc tatttcacag caaggaaatt caccttcaaa agcactgatt
acccaatgca cctccctccc cagctcgaga tcattcttca attaggacac
aaaccagaca ggtttaatag cgaatctaat tttgaattct gaccatggat
acccatcact ttggcattca gtgctacatg tgtatttтat ataaaaatcc
catttcttga agataaaaaa attgttattc aaattgttat gcacagaatg
tttttggtaa tattaatttc cactaaaaaa ttaaatgtct

FIG._3D

PLPKTQANHGA

FIG._3E

cact tcccaagacc caggccaatc atggagc

FIG._3F

SHLLFKLPQELLKPRS

FIG._3G

gccactt gctattcaag cttcctcagg agctgctgaa acccaggtca

FIG._3H

TSSRGLVFHTGTKNSFMALYLSKGRLVFALGTDGKKLRIKSKEKCNDGKWHTVVFGHDGEKGRL
VVDGLRAREGSLPGNSTISIRAPVYLGSPPSGKPKSLPTNSFVGCLKNFQLDSKPLYTPSSSFG
VSS

FIG._3I

gacaacatcc tccagaggac tggtgtttca cacgggcact aagaactcct
ttatggctct ttatctttca aaaggacgtc tggtctttgc actggggaca
gatgggaaaa aattgaggat caaaagcaag gagaaatgca atgatgggaa
atggcacacg gtggtgtttg gccatgatgg ggaaaagggg cgcttggttg
tggatggact gagggcccgg gagggaagtt tgcctggaaa ctccaccatc
agcatcagag cgccagttta cctgggatca cctccatcag ggaaaccaaa
gagcctcccc acaaacagct ttgtgggatg cctgaagaac tttcagctgg
attcaaaacc cttgtatacc ccttcttcaa gcttcggggt gtcttcct

FIG._3J

TSSRGLVFHTGTKNSFMALYLSKGRLVFALGTDGKKLRIKSKEKCNDGKWHTVVFGHDGEKGRL
VVDGLRAREGSLPGNSTISIRAPVYLGSPPSGKPKSLPTNSFVGCLKNFQLDSKPLYTPSSSFG
VSSCLGGPLEKGIYFSEEGGHVVLAHSVLLGPEFKLVFSIRPRSLTGILIHIGSQPGKHLCVYL
EAGKVTASMDSGAGGTSTSVTPKQSLCDGQWHSVAVTIKQHILHLELDTDSSYTAGQIPFPPAS
TQEPLHLGGAPANLTTLRIPVWKSFFGCLRNIHVNHIPVPVTEALEVQGPVSLNGCPDQ

FIG._3K

catcc tccagaggac tggtgtttca cacgggcact aagaactcct ttatggctct
ttatctttca aaaggacgtc tggtctttgc actggggaca gatgggaaaa
aattgaggat caaaagcaag gagaaatgca atgatgggaa atggcacacg
gtggtgtttg gccatgatgg ggaaaagggg cgcttggttg tggatggact
gagggcccgg gagggaagtt tgcctggaaa ctccaccatc agcatcagag
cgccagttta cctgggatca cctccatcag ggaaaccaaa gagcctcccc
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cttgtatacc ccttcttcaa gcttcggggt gtcttcctgc ttgggtggtc
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gctcactctg tattgttggg gccagaattt aagcttgttt tcagcatccg
cccaagaagt ctcactggga tcctaataca catcggaagt cagcccggga
agcacttatg tgtttacctg gaggcaggaa aggtcacggc ctctatggac
agtggggcag gtgggacctc aacgtcggtc acaccaaagc agtctctgtg
tgatggacag tggcactcgg tggcagtcac cataaacaa cacatcctgc
acctggaact ggacacagac agtagctaca cagctggaca gatcccttc
ccacctgcca gcactcaaga gccactacac cttggaggtg ctccagccaa
tttgacgaca ctgaggatcc ctgtgtggaa atcattcttt ggctgtctga
ggaatattca tgtcaatcac atccctgtcc ctgtcactga agccttggaa
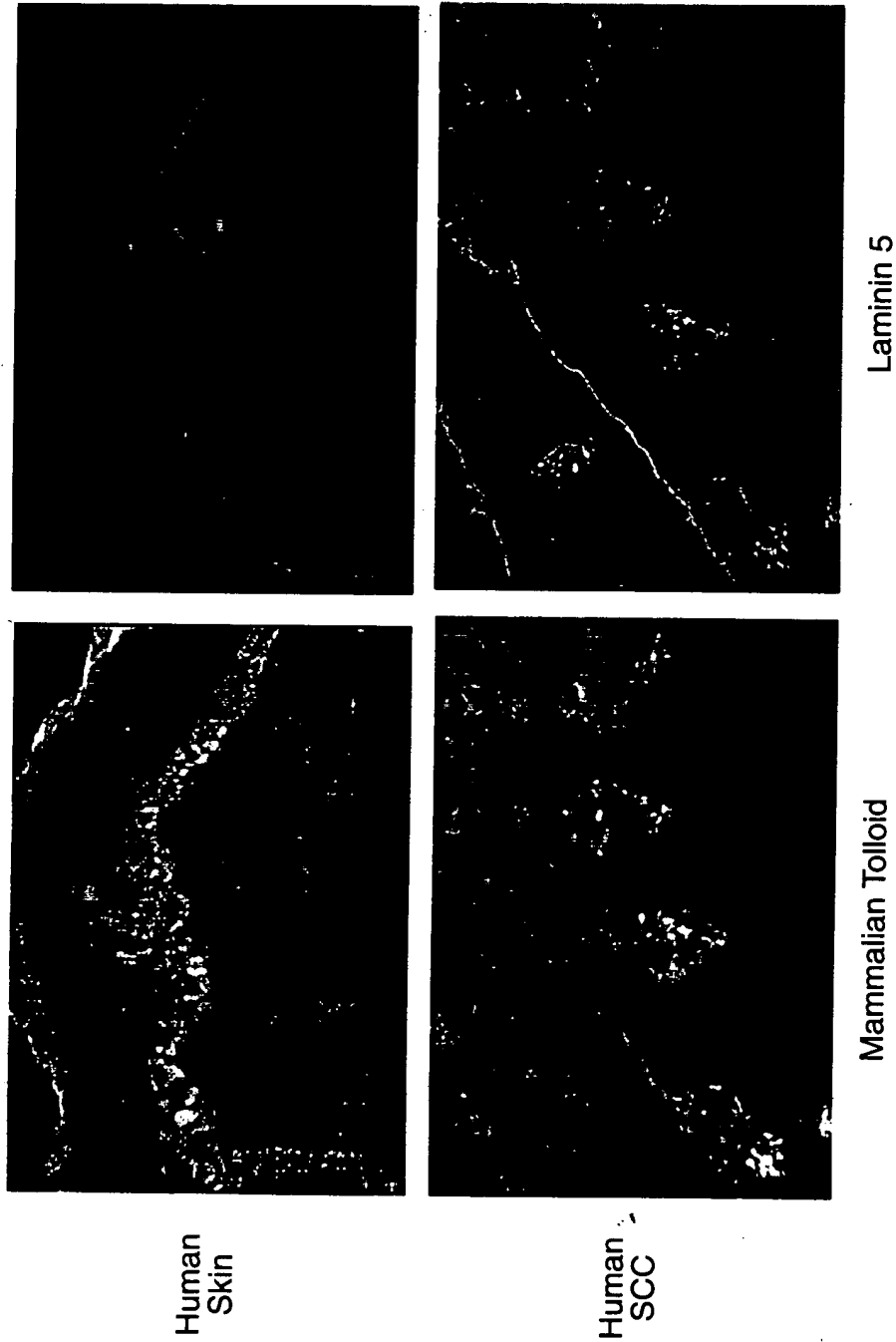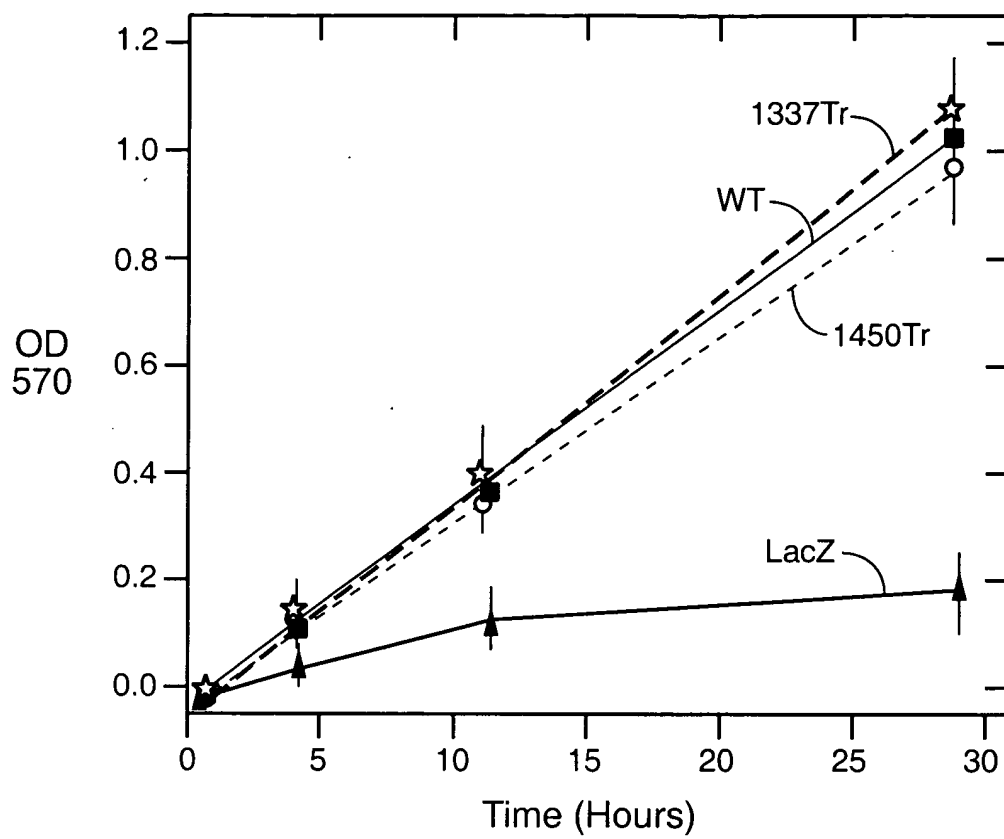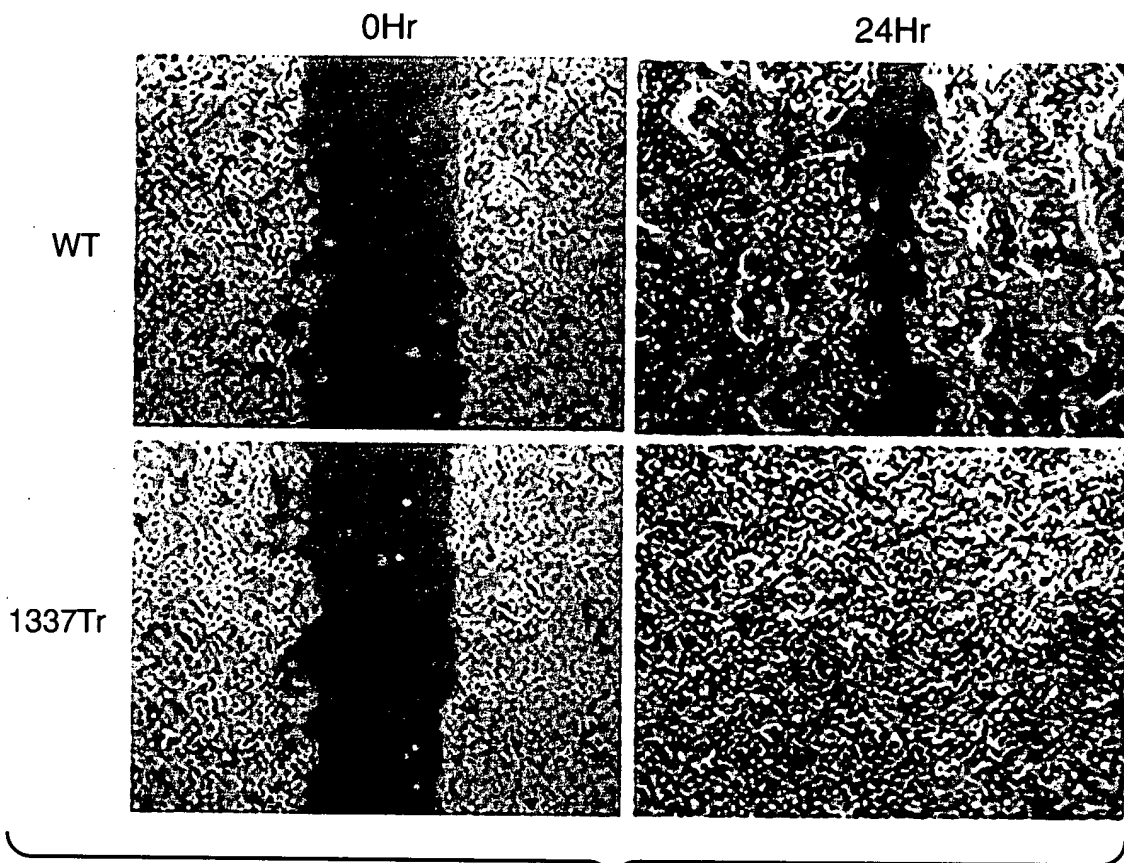gtccaggggc ctgtcagtct gaatggttgt

FIG._3I

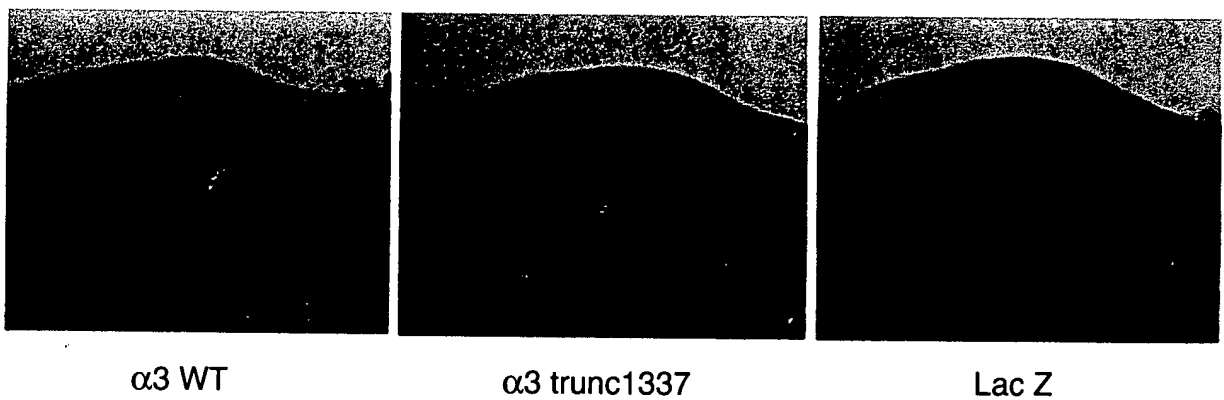FKLVFSIRPRSLTGILIHIGSQPGKHLCVYLEAGKVTASMDSGAGGTSTSVTPKQSLCDGQWHS
VAVTIKQHILHLELDTDSSYTAGQIPFPPASTQEPLHLGGAPANLTTLRIPVWKSFFGCLRNIH
VNHIPVPVTEALEVQGPVSLNGCPDQ

FIG._3M

```
tt aagcttgttt tcagcatccg cccaagaagt ctcactggga tcctaataca
catcggaagt cagcccggga agcacttatg tgtttacctg gaggcaggaa
aggtcacggc ctctatggac agtggggcag gtgggacctc aacgtcggtc
acaccaaagc agtctctgtg tgatggacag tggcactcgg tggcagtcac
cataaaacaa cacatcctgc acctggaact ggacacagac agtagctaca
cagctggaca gatccccttc ccacctgcca gcactcaaga gccactacac
cttggaggtg ctccagccaa tttgacgaca ctgaggatcc ctgtgtggaa
atcattcttt ggctgtctga ggaatattca tgtcaatcac atccctgtcc
ctgtcactga agccttggaa gtccaggggc ctgtcagtct gaatggttgt
cctgaccagt
```

FIG._3N

Human Skin

Human SCC

Mammalian Tolloid

Laminin 5

FIG._4

FIG._5

FIG._6

α3 WT   α3 trunc1337   Lac Z

FIG._7